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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,666	10/31/2003	Paul J. Husted	ATH-0137	1028

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EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,666	HUSTED, PAUL J.	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16,18-23 and 25-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,14-16,21-23 and 30-32* is/are rejected.

7)☒ Claim(s) *5-13,18-20,25-29 and 34-39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Remarks

1. Applicant's remarks, see page 12, filed 6/7/2007, with respect to objection to the specification have been fully considered and are persuasive. The objection of the specification has been withdrawn.

2. Applicant's arguments, see page 12-13, filed 6/7/2007, with respect to the rejections of claims 1, 14, 21, 30-32, and 34-39 under 35 U.S.C. § 101, 102(e), and 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Piirainen (WO 99/39484).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Piirainen (WO 99/39484).

(1) Regarding claim 1:

Piirainen discloses a method of determining a modulation type of a received signal (page 2, lines 21-24) comprising:

beginning demodulation of the received signal using components associated with each potential type of modulation (the digital signal is demodulated in the demodulator 106, the demodulator 106 operates in such a way that it comprises a specific demodulator for each of the N modulation alternatives, demodulator 106 in figure 1, page 4, lines 7-9);

providing a identification value (impulse responses) to a voting block (ML (maximum likelihood) 110, selection 112 and detector 114 in figure 1) for each potential type of modulation based o the received signal (an impulse response estimate is formed for the demodulated signal in means 108 and input to ML 110, selection 112 as shown in figure 1, page 4, lines 9-13); and

using a technique in the voting block to determine the modulation type (the means 110 control a selection means 112 to select a signal to a detector 114 from the demodulator on the basis of the maximum likelihood, page 4, lines 17-19), wherein the technique is based at least on the identification values (impulse response from the impulse response means 108) and including determining a strength of the received signal (the ML 110 determines the maximum likelihood of each impulse responses; the principle of maximum likelihood can be based on the energy of the impulse response, page 4, lines 13-14).

(2) Regarding claim 21:

Piirainen discloses a system for determining a modulation of a received signal comprising:

modulator identifiers for providing identification values (impulse responses) for potential types of modulation based on the received signal (an impulse response estimate is formed for the demodulated signal in means 108 as shown in figure 1, page 4, lines 9-13);

means for determining a strength of the received signal (the ML 110 determines the maximum likelihood of each impulse responses; the principle of maximum likelihood can be based on the energy of the impulse response, page 4, lines 13-14); and

a vote block (ML (maximum likelihood) 110, selection 112 and detector 114 in figure 1) for determining the modulation, wherein the voting block uses a technique based at least on the identification values and the strength of the received signal (the means 110 control a selection means 112 to select a signal to a detector 114 from the demodulator on the basis of the maximum likelihood, page 4, lines 17-19).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Li et al. (US 2004/0030530 A1).

Piirainen discloses all the subject matter as discussed in claim 1 above except the identification value includes a normalized correlation value based on characteristics of the type of modulation.

However, Li et al. discloses wherein the identification value includes a normalized correlation value based on characteristics of the type of modulation (as shown in step 120 of figure 1, calculate a sequence of correlation measures {C(n)}, between the sample sequence {r(n)} from a newly arrived network packet and Barker sequence, in step 150, normalize the maximum of the {Am(N)} sequence with respect to the statistic of the {r(n)} sequence and then determine whether the newly arrived network packet comprises the DSSS PLCP preamble based on a comparison between the normalized maximum and a predetermined threshold, paragraph 0024 – paragraph 0031).

It is desirable wherein the identification value includes a normalized correlation value based on characteristics of the type of modulation because it provides a low false alarm probability to ensure a good packet error rate for high network throughput (paragraph 0007, lines 11-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Li et al. in the method of Piirainen to improve the efficiency of the method.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Apostolos et al. (US 4,166,980).

Piirainen discloses all the subject matter as discuss in claims 1 except the identification value includes an absolute modulation-specific correlation value.

However, Apostolos et al. discloses the identification value includes an absolute modulation-specific correlation value (Apostolos et al. discloses a method of generating histograms which is a diagram, correlation or pattern which is characteristics of the modulation type, such as FSK and PSK, column 3, lines 9-11, as this histogram is always a positive value, it is inherent that it is an absolute modulation-specific correlation value).

It is desirable for the identification value includes an absolute modulation-specific correlation value because it requires less time for signal acquisition (column 3, lines 27-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Apostolos et al. in the method of Piirainen to improve the performance of the method.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in vie of Ueda (US 5,644,597).

Piirainen discloses a method of determining a modulation type of a received signal (page 2, lines 21-24) comprising:

beginning demodulation of the received signal using components associated with each potential type of modulation (the digital signal is demodulated in the demodulator 106, the demodulator 106 operates in such a way that it comprises a specific

demodulator for each of the N modulation alternatives, demodulator 106 in figure 1, page 4, lines 7-9);

providing a identification value (impulse responses) to a voting block (ML (maximum likelihood) 110, selection 112 and detector 114 in figure 1) for each potential type of modulation based o the received signal (an impulse response estimate is formed for the demodulated signal in means 108 and input to ML 110, selection 112 as shown in figure 1, page 4, lines 9-13); and

using a technique in the voting block to determine the modulation type (the means 110 control a selection means 112 to select a signal to a detector 114 from the demodulator on the basis of the maximum likelihood, page 4, lines 17-19), wherein the technique is based at least on the identification values (impulse response from the impulse response means 108) and including determining a strength of the received signal (the ML 110 determines the maximum likelihood of each impulse responses; the principle of maximum likelihood can be based on the energy of the impulse response, page 4, lines 13-14).

Piirainen fails to disclose deactivating receiver components associated with modulations other than that of the determined modulation.

However, Ueda discloses deactivating components other than that of the determined one (comparator 124 outputs the result of selection to the selecting circuit and outputs a stop signal to each of the remaining three adaptive equalizers which have not been selected, the three equalizer stop the equalization of the remaining random data in response to the stop signal, column 36, lines 14-19).

It is desirable to deactivating receiver components associated with modulations other than that of the determined modulation because it can reduce power consumption by turning off the component that is not needed. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ueda in the system of Piirainen to increase the power efficiency of the system.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Ueda (US 5,644,597) as applied to claim 14 above, and further in view of Li et al. (US 2004/0030530 A1).

Piirainen and Ueda et al. disclose all the subject matter as discuss in claim 14 except wherein the identification value includes a normalized correlation value based on characteristics of the potential modulation.

However, However, Li et al. discloses wherein the identification value includes a normalized correlation value based on characteristics of the potential modulation (figure 1 illustrated a primary steps for DSSS detection in 802.11a/g system, in step 120, calculate a sequence of correlation measures {C(n)}, between the sample sequence {r(n)} from a newly arrived network packet and Barker sequence, in step 150, normalize the maximum of the {Am(N)} sequence with respect to the statistic of the {r(n)} sequence and then determine whether the newly arrived network packet comprises the DSSS PLCP preamble based on a comparison between the normalized maximum and a predetermined threshold, paragraph 0024 – paragraph 0031).

It is desirable wherein the identification value includes a normalized correlation value based on characteristics of the potential modulation because it provides a low false alarm probability to ensure a good packet error rate for high network throughput (paragraph 0007, lines 11-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Li et al. in the method of Piirainen and Ueda to improve the efficiency of the method.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Ueda (US 5,644,597) as applied to claim 14 above, and further in view of Apostolos et al. (US 4,166,980).

Piirainen and Ueda et al. disclose all the subject matter as discuss in claim 14 except the identification value includes an absolute modulation-specific correlation value.

However, Apostolos et al. discloses the identification value includes an absolute modulation-specific correlation value (Apostolos et al. discloses a method of generating histograms which is a diagram, correlation or pattern which is characteristics of the modulation type, such as FSK and PSK, column 3, lines 9-11, as this histogram is always a positive value, it is inherent that it is an absolute modulation-specific correlation value).

It is desirable for the identification value includes an absolute modulation-specific correlation value because it requires less time for signal acquisition (column 3, lines 27-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time

of invention to employ the teaching of Li et al. in the method of Piirainen and Ueda to improve the performance of the method.

11. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Sato (US 5,517,524).

(1) Regarding claim 22:

Piirainen discloses all the subject matter as discussed in claim 21 except each of the modulator identifiers includes means for generating a normalized correlation value based on characteristics of the type of modulation.

However, Sato discloses an impulse response estimating circuit that generates an impulse response estimation of the signal (circuit 5 in figure 2, column 5, lines 6-10) and the estimates impulse response is normalized by the initial value determining circuit (10 in figure 2, column 4, lines 11-12).

It is desirable for the modulator identifiers includes means for generating a normalized correlation value based on characteristics of the type of modulation because the normalization process can smooth out the impulse response for comparison in the decision comparison and avoid false detection. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Sato in the apparatus of Piirainen to improve the reliability of the system.

(2) Regarding claim 23:

Hiirainen discloses all the subject matter as discussed in claim 21 except wherein each of the modulator identifiers include means for computing an absolute modulation-specific correlation value.

However, Sato discloses a normalization process of the estimated impulse response, by the process of normalization, the modulation identifiers (impulse response estimates) will be in an absolute correlation value.

It is desirable for the modulator identifiers include means for computing an absolute modulation-specific correlation value because it speeds up the comparison process in the decision step. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Sato in the apparatus of Piirainen to improve the reliability of the system.

12. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Sills et al. (US 6,690,746 B1).

Piirainen discloses a system to determine a modulation type of a receive signal comprising:

providing an identification value (impulse responses) for each potential type of modulation based on the received signal and a received signal strength (an impulse response estimate is formed for the demodulated signal in means 108 and input to ML 110, selection 112 as shown in figure 1, page 4, lines 9-13, the ML 110 determines the maximum likelihood of each impulse responses; the principle of maximum likelihood can be based on the energy of the impulse response, page 4, lines 13-14); and

using a technique to determine the modulation wherein the technique is based at least on the identification value (the means 110 control a selection means 112 to select a signal to a detector 114 from the demodulator on the basis of the maximum likelihood, page 4, lines 17-19).

Piirainen fails to disclose implementing the system in computer software embodying in a computer readable medium.

However, Sills et al. discloses implementing a signal recognizer in a computer program (column 4, lines 27-38).

It is desirable to implement the system in a computer program embodying in a computer readable medium because it can reduce the production cost and easier for updating the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Sills with the system of Piirainen to reduce the production cost of the system.

13. Claim 31 and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/39484) in view of Sills et al. (US 6,690,746 B1) as applied to claim 30 above, and further in view of Sato (US 5,517,524).

(1) Regarding claim 31:

Hiirainen and Sato discloses all the subject matter as discussed in claim 30 except the code for providing the identification value includes code for generating a normalized correlation value based on characteristics of the type of modulation.

However, Sato discloses an impulse response estimating circuit that generates an impulse response estimation of the signal (circuit 5 in figure 2, column 5, lines 6-10) and the estimates impulse response is normalized by the initial value determining circuit (10 in figure 2, column 4, lines 11-12).

It is desirable for the modulator identifiers includes means for generating a normalized correlation value based on characteristics of the type of modulation because the normalization process can smooth out the impulse response for comparison in the decision comparison and avoid false detection. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Sato in the computer readable medium embodying the computer software program of Piirainen and Sills et al. to improve the reliability of the system.

(2) Regarding claim 23:

Hiirainen and Sills et al. discloses all the subject matter as discussed in claim 21 except wherein each of the modulator identifiers include means for computing an absolute modulation-specific correlation value.

However, Sato discloses a normalization process of the estimated impulse response, by the process of normalization, the modulation identifiers (impulse response estimates) will be in an absolute correlation value.

It is desirable for the modulator identifiers include means for computing an absolute modulation-specific correlation value because it speeds up the comparison process in the decision step. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Sato in the computer

readable medium embodying the computer software program of Piirainen and Sills et al. to improve the reliability of the system.

Allowable Subject Matter

14. Claims 5-13, 18-20, 25-29, and 34-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ushirokawa (US 5,323,422) discloses an adaptive receiver apparatus. Sandaralingam (US 2004/0097207 A1) discloses a receiver to determine modulation type. Isaacson et al. (US 4,845,707) discloses a frequency division multiplex/FM modulation recognition system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M Lee
Examiner
Art Unit 2611
8/6/2007

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER